



Standardisation – Projects (Call 2016)

An overview of the set of projects funded under the Targeted Programme Pre- and Co-Normative research.

The aim of these projects is to develop metrological methods and techniques required for standardisation.

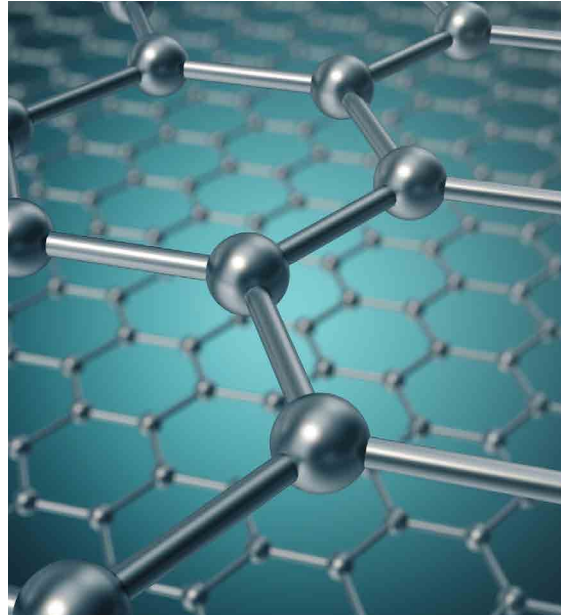
Focus is placed on both the specific documented demands of European and international Standards Developing Organisations (SDOs) and with a potential for high impact on European standardisation.

Standards for industrial production of graphene

New methods to be developed for electrical characterisation of graphene

Graphene is tipped to underpin a new generation of electronics, but is held back by challenges in producing large areas with uniform electrical properties. As new methods of graphene production are developed, there is a need for accurate and reproducible characterisation methods suited to the unique properties of graphene.

This project will investigate new and existing methodologies for the electrical characterisation of graphene to develop an accurate and traceable approach, and develop high-throughput electrical characterisation approaches. These methodologies will be disseminated as Good Practice Guides for contact and non-contact and high speed measurements, and the project will work with technical committees to input the best practice into documentary standards, which will ultimately be adopted by industry. Together, these will enable the characterisation of graphene as an industrial product, enabling validated commercial specifications of graphene to be produced at an industrial scale, and allowing customers to reliably identify suitable graphene products for their applications.



Project 16NRM01

Developing electrical characterisation methods for future graphene electronics

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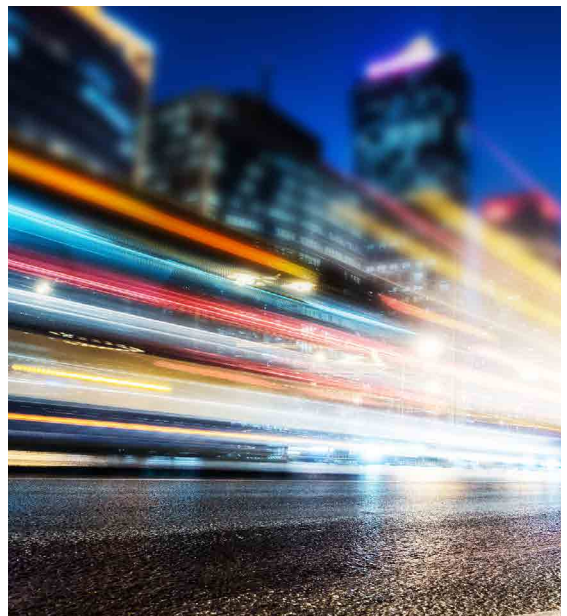
www.euramet.org/project-16nrm01

Measuring road reflection to improve street lights

Better tools to calculate light reflection will create safer roads

Road lighting must provide sufficient light for road safety. International CEN and CIE standards require light levels to be calculated using reference tables of geometrical values of road surface reflection. These tables are based on 40 year old measurements, which do not cover all road geometries defined in current iterations of these standards, nor recent advances in pavements and road lighting.

This project will provide standards organisations with updated measurements and guidance to solve these deficiencies. It will identify new geometries for measuring light reflectance on roads, develop guidelines for evaluating road conditions such as ageing and wetness, and establish traceable measured data from current road materials needed to update reference tables. It will also produce guidelines and reference materials for calibrating portable commercial devices for on-site luminance measurements. New reliable data will be included in updated road lighting standards. These will allow lighting designers to improve performance, cut energy consumption, and create safer night-time driving.



Project 16NRM02

Pavement surface characterisation for smart and efficient road lighting

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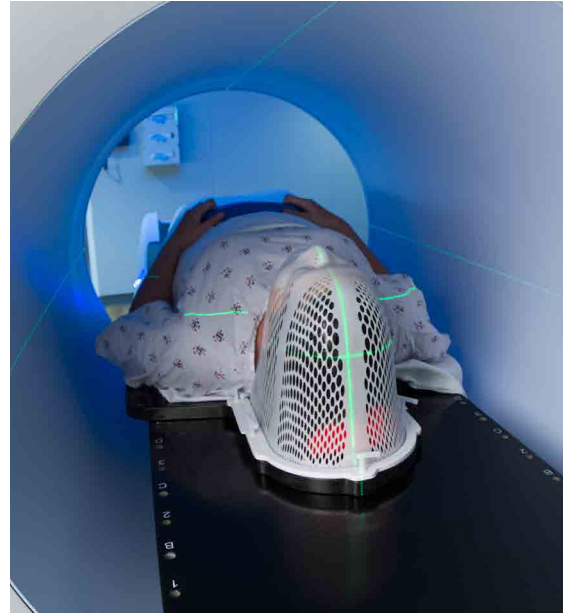
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New correction factors for radiotherapy calibration

New cancer treatments need new calibration calculations to ensure accuracy

Half of the 3.4 million Europeans diagnosed with cancer every year are treated with ionizing radiation. To ensure safety, radiation beams need to be calibrated. Correcting for differences between beam quality at the calibration laboratory and the hospital, a factor called k_{Q,Q_0} , is an important aspect of calibration. The International Atomic Energy Agency's protocol TRS-398, which governs radiotherapy dosimetry, uses k_{Q,Q_0} values calculated in the 1990s. A major revision is underway to reflect advances in technology, new primary standards, and improved metrology and modelling.

This project will measure k_{Q,Q_0} values using the latest ionization radiation technologies ensuring traceability to the SI, and also calculate k_{Q,Q_0} using Monte Carlo modelling. The datasets will be compared to understand potential differences between measured and computed values. Validated values will be incorporated in the upcoming TRS-398 revision. Through the revised protocol, European hospitals will have reliable correction factors for the latest ionizing radiation technologies, ensuring beams which treat 1.7 million citizens annually are accurately calibrated.



Project 16NRM03

k_{Q,Q_0} factors in modern external beam radiotherapy applications to update IAEA TRS-398

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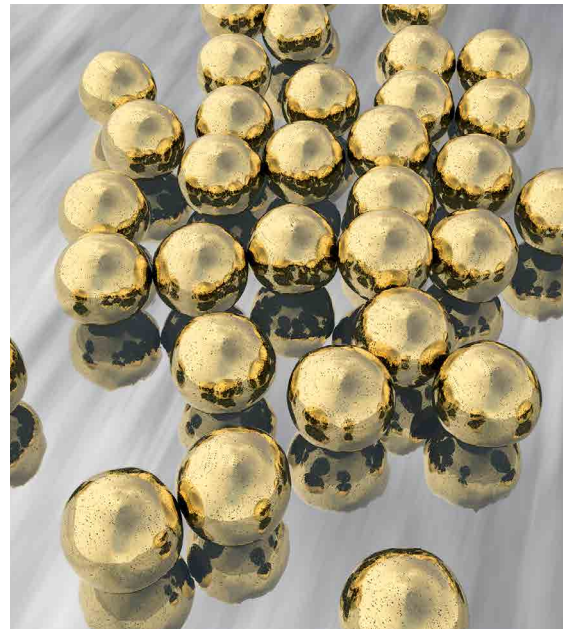
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Building trust in magnetic nanoparticles

New measurement approaches will characterise magnetic nanoparticles and spur innovation

Magnetic nanoparticles (MNPs) can be precisely manoeuvred by magnetic fields, and so offer many potentially valuable applications, such as targeting cells for cancer treatment, as well as in other biomedical applications, waste water treatment and acoustics. There are currently no international standards for measuring the magnetic properties of MNPs, thereby undermining consumer trust and hampering innovation. A new ISO standard "Liquid suspensions of magnetic nanoparticles" is in development.

This project will develop new MNP measurement approaches, including identifying and defining relevant physical parameters (eg saturation magnetisation, composition, magnetic interaction), and identify appropriate methods for measuring these. It will summarise the results, alongside those from other relevant projects, from a standardisation point of view and feed these into the standardisation process. The resulting ISO standard will provide the MNP industry - largely SMEs with limited resources - with improved confidence in magnetic properties and the ability to market new innovations accordingly.



Project 16NRM04

Towards an ISO standard for magnetic nanoparticles

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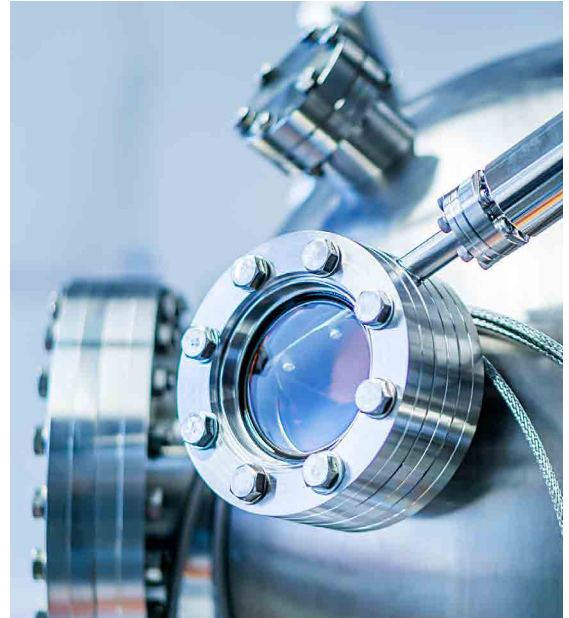
www.euramet.org/project-16nrm04

Creating standardised ionisation gauges

More reliable vacuum measurements for materials researchers and electronics manufacturers

High and ultra-high vacuums are used for cutting edge materials research and in the production of microelectronics. Ionisation gauges are the only method for measuring pressure in such vacuums. Different approaches to constructing ionisation gauges, and different gases used for the ionisation process, has led to significant differences in the relative sensitivity factors between them with all lacking long-term stability. The performance of the approaches could be greatly improved by standardisation.

This project will use results from EMRP project IND12 Vacuum and EMPIR project 14SIP01 Vacuum ISO to specify all relevant parameters for an improved and standardised ionisation gauge, including gathering data on the relative sensitivities of gases used in different gauge types. The technical results will inform new ISO standards on ionisation gauges. A standardised ionisation gauge with long term stability will provide a reliable reference standard for calibration laboratories, and be easily reproduced by manufacturers, allowing them to meet the forthcoming standard. This will provide greater accuracy to the vacuum market, and the many industries it supports.



Project 16NRM05

Towards a documentary standard for an ionisation vacuum gauge

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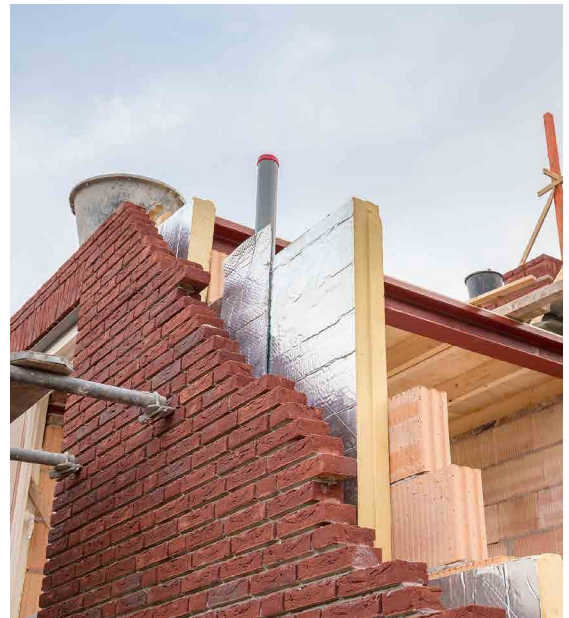
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Reliable measurements of reflective insulation

Traceable emissivity measurements will help develop higher performance insulation materials

Reflective insulation helps buildings improve energy efficiency. Manufacturers of these products must declare their surface emissivity, so customers can calculate energy savings in accordance with EU directives. Different emissivity measurement techniques have large discrepancies and there is an urgent need to improve accuracy of these measurements to enhance innovation and allow superior products to demonstrate their added benefits.

Responding to this need, this project will test commercial emissivity measurement techniques to understand their limitations, and improve reference techniques at NMIs to lower uncertainties. It will create reference samples and best practice calibration and measurement procedures which bring traceability to commercial instruments. The results will be used to propose amendments to current standards EN 16012 and ISO 6946. This will allow developers of thermal insulation materials to perform reliable emissivity measurements, and develop higher performance products. Such products will help improve energy efficiency in buildings, and also support other industries which use reflective foils, including aerospace, automotive, nuclear power, and packaging.



Project 16NRM06

Improvement of emissivity measurements on reflective insulation materials

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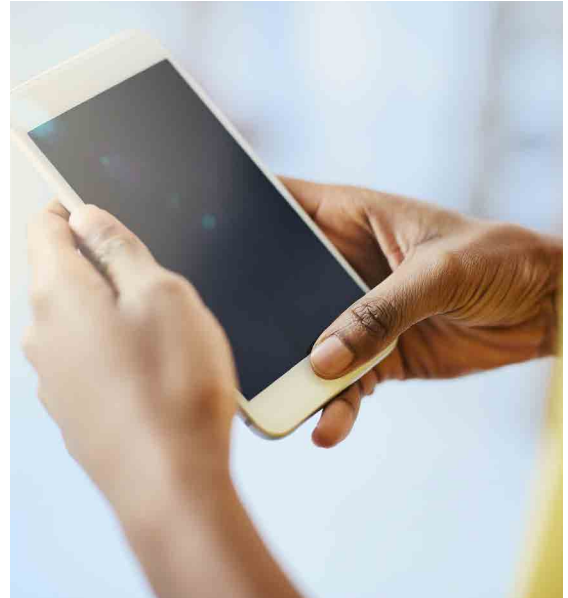
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Faster phone safety testing

Validating quicker methods for measuring energy absorption from mobile phones

International regulations require that the energy from mobile phone electromagnetic fields which is absorbed by their users - the specific absorption rate (SAR) - does not exceed safe limits. Current single sensor SAR measurement approaches require excessive testing time and are unable to measure all possible configurations of modern mobile devices. An improved vector based measurement approach has been developed, which uses arrays of sensors to "image" the fields. This is 100 times faster and measures a wider range of parameters, but needs standardisation.

This project will develop traceable calibration methods, software and modelling tools, and uncertainty analysis for vector based approaches, and validate their performance for real-world devices. Results will inform the new IEC 62209-3 standard, which will allow the use of vector based systems for SAR testing, and also support development of new 5G standards. This will reduce the testing time for mobile device manufacturers, decrease the time to market, and build higher public confidence in mobile safety.



Project 16NRM07

SAR measurement using vector probes

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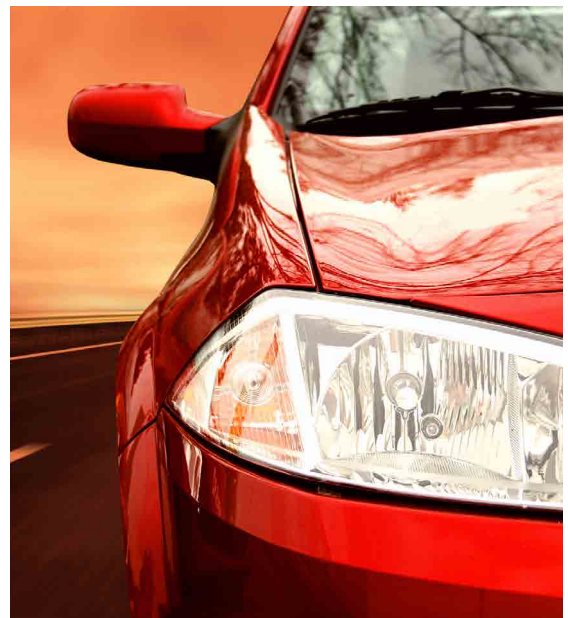
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New standards for measuring visual effects

Helping industry control colour, texture, gloss and sparkle

Products from cars, to cosmetics, to paper depend upon sophisticated visual effects - colour, gloss, transparency, texture - for commercial success. Considerable R&D goes into creating metallic paints, pigments, finishes, sparkle and grainy effects. Commercial devices using Bidirectional Reflectance Distribution Function (BRDF), a reflection technique suitable for measuring sophisticated visual effects, have recently been developed. Primary references and calibration artefacts for these have been established at NMIs, but there remains a lack of BRDF standards.

The project will use results from EMRP project IND52 xDReflect to carry out BRDF measurements on different visual effects and independently validate them, and use these measurements to propose standards and guidance, as well as agreeing formats for measurement data. It will make recommendations for the characterisation of surface gloss, sparkle and graininess effects and agree new approaches for measuring these. Standardised approaches to BRDF will help manufacturers produce a new generation of instruments, giving many industries, including automotive and cosmetics, better control of product appearance and higher customer satisfaction



Project 16NRM08

Bidirectional reflectance definitions

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EMPIR - joint research projects for Europe

Europe's National Measurement Institutes working together

The majority of European countries have a National Metrology Institute (NMI) that ensures national measurement standards are consistent and comparable to international standards. They also investigate new and improved ways to measure, in response to the changing demands of the world. It makes sense for these NMIs to collaborate with one another, and the European Association of National Metrology Institutes (EURAMET) is the body that coordinates collaborative activities in Europe.

The European Metrology Programme for Innovation and Research (EMPIR) follows on from the successful European Metrology Research Programme (EMRP), both implemented by EURAMET. The programmes are jointly funded by the participating countries and the European Union and have a joint budget of over 1000 M€ for calls between 2009 and 2020. The programmes facilitate the formation of joint research projects between different NMIs and other organisations, including businesses, industry and universities. This accelerates innovation in areas where shared resources and decision-making processes are desirable because of economic factors and the distribution of expertise across countries or industrial sectors.

EURAMET wants to involve European industry and universities at all stages of the programme, from proposing Potential Research Topics to hosting researchers funded by grants to accelerate the adoption of the outputs of the projects.



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